

Remarks

The various parts of the Office Action (and other matters, if any) are discussed below under appropriate headings.

Election/Restriction

The election of claims 1-13, 15, and 16 is affirmed. Claims 14 and 17-20 have been canceled without prejudice or disclaimer of the subject matter contained therein.

Claim Rejections - 35 USC § 112

Claims 2, 7, and 13 were rejected as being indefinite. Claims 2 and 13 have been amended for clarity and claim 7 has been amended to add units to the diameter of the contact holes. In view of these amendments, withdrawal of the rejection of claims 2, 7, and 13 is respectfully requested. No new matter has been added.

Claim Rejections - 35 USC § 102 and § 103

Claim 1 recites a method of forming a plurality of contact holes that includes, among other steps, exposing a photoresist layer to a double-dipole illumination source that includes a first dipole aperture oriented and optimized for patterning regularly spaced contact holes and a second dipole aperture optimized for patterning the plurality of semi-isolated contact holes.

Wang fails to disclose or fairly suggest a double-dipole illumination source that includes a first dipole aperture oriented and optimized for patterning regularly spaced contact holes and a second dipole aperture optimized for patterning the plurality of semi-isolated contact holes.

While the Office Action points to columns 3-4, lines 66-67 and 1-10 as teaching a quadrupole filter, and considers the quadrupole filter to be equivalent to two dipole filters placed together, it is respectfully submitted that, by definition, a quadrupole filter has four symmetrically arranged openings of the same geometry (see column 4, lines 36-39). In contrast, claim 1 recites a first dipole aperture oriented and optimized to serve a certain patterning function, e.g. patterning regularly spaced contact holes, and a second dipole aperture optimized to serve another patterning function, e.g. patterning the plurality of semi-isolated contact holes.

For at least this reason, it is respectfully submitted that the rejection of claim 1 should be withdrawn.

Claim 2, as amended, recites a method of forming a plurality of contact holes that includes, among other steps, exposing a photoresist layer to a double-dipole illumination source that includes a first dipole aperture oriented and optimized for patterning regularly spaced contact holes and a second dipole aperture optimized for patterning the plurality of semi-isolated contact holes, wherein the first dipole aperture and the second dipole aperture have at least one of (i) different sizes or (ii) different spacings.

As discussed above, Wang fails to disclose a first dipole aperture oriented and optimized for patterning regularly spaced contact holes and a second dipole aperture optimized for patterning a plurality of semi-isolated contact holes. In addition, Wang fails to disclose or fairly suggest a first dipole aperture and a second dipole aperture have at least one of different sizes or different spacings.

While the Office Action points to column 4, lines 54-59 as teaching a quadrupole filter with annular sectors having sizes within a certain range, this disclosure is insufficient to anticipate or render obvious the claim 2 recitation of the first dipole aperture and the second dipole aperture having at least one of (i) different sizes or (ii) different spacings. As discussed above, Wang has been found to disclose a quadrupole filter 42 having four symmetrically arranged annular sectors 72 of the same geometry, i.e., the same size and shape. The dimensions cited in column 4 only create a size range for the annular sectors 72 as a group, relative to the circle 61. The four sectors are still equally sized (see Fig. 7 and col. 4, lines 54-55, which state that "[t]he relative dimensions of the circle 61 and each of the annular sectors 72 must be such that..." (emphasis added)). In contrast, claim 2 recites a first dipole aperture and a second dipole aperture having at least one of different sizes or different spacings.

For at least these reasons, it is respectfully submitted that the rejection of claim 2 and claims 3-13, 15, and 16 dependent therefrom should be withdrawn.

Telephone Interview

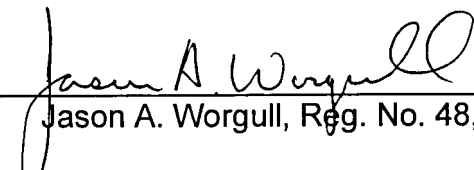
In the interests of advancing this application to issue and compact prosecution, it is respectfully requested that the Examiner telephone the undersigned to discuss any of the foregoing with which there may be some controversy or confusion or to make any suggestions that the Examiner may have to place the application in condition for allowance.

Conclusion

In view of the foregoing, request is made for timely issuance of a notice of allowance.

Respectfully submitted,

RENNER, OTTO, BOISSELLE & SKLAR, LLP

By 
Jason A. Worgull, Reg. No. 48,044

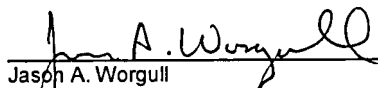
1621 Euclid Avenue
Nineteenth Floor
Cleveland, Ohio 44115
(216) 621-1113

CERTIFICATION MAILING/FACSIMILE TRANSMITTAL/ELECTRONIC FILING

I hereby certify that this paper (along with any paper or item referred to as being attached or enclosed) is being:

- ☐ deposited with the United States Postal Service on the date shown below with sufficient postage as first-class mail in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450; or
- ☐ facsimile transmitted to the Patent and Trademark Office (fax no. < >) on the date shown below; or
- ☒ submitted on the date shown below using the U.S. Patent Office's Electronic Filing System.

Date: 6-28-07


Jason A. Worgull